



AP 108

Miniature sensor, with flexible lead wire in armour, suitable for temperature measurement of movable elements, e.g. press moulds, injection moulds etc. It can be applied to measurement of liquids in small tanks and pipelines where atmospheric pressure occurs.

### Specification

#### Temperature range / sensing element

-50÷250°C	<b>Pt100</b>	class B
-40÷400°C	<b>K, J</b>	class 2

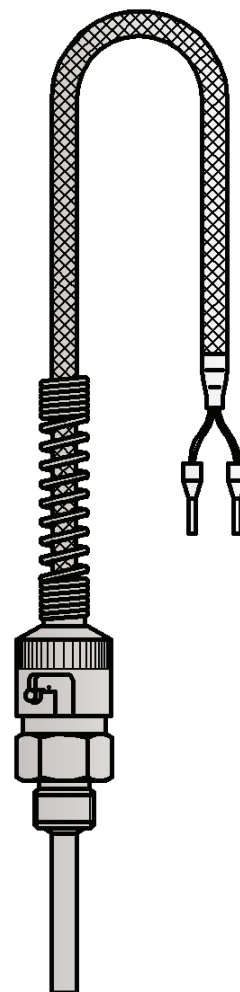
#### Sheath

– material: nickel-plated brass, atmospheric pressure

#### Lead wire

- stranded Cu wire 2x0,35mm<sup>2</sup> with teflon insulation, metal overbraid
- thermocouple stranded wire 2x0,22mm<sup>2</sup> with double fiberglass insulation, metal overbraid
- length  $L_p$  [m]: 1,5 (standard)
- Cu wire resistance 0,105Ω/m = ~0,2°C

Other parameters acc. to requirements



### Options

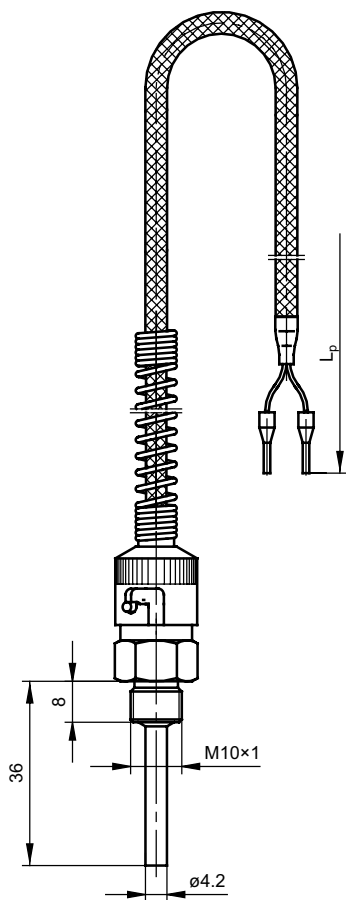
#### Temperature transmitter application

Temperature transmitter with standard 4÷20mA, 0÷10V output signals and with the HART or PROFIBUS communication protocols can be installed in the control cabinet.

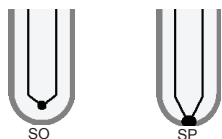
#### Non-standard design

Process connection thread and other parameters can be customized per client request.

**Calibrations performed by Limatherm Sensor Sp. z o.o. are confirmed with the Calibration Certificate of the Accredited Laboratory for Temperature Measurements.**



Thermocouple hot junction types



#### Compensation / thermocouple wire insulations

Insulation material	Operating temperature range [°C]	Properties
PCW (PCV)	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
Yc- polyvinyl chloride	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
FEP-teflon	-50÷200	Resistant to oils, acids and other aggressive liquids. Good flexibility.
Si-silicone	-50÷180	Waterproof, flexible. Applied in high humidity conditions.
Ws-fiberglass	-60÷400	Good resistance to high temperature Low resistance to liquid penetration.

**Notes:** Additionally, copper or steel braids/shields are used on wires to prevent electrical noises, Increasing, at the same time, wire insulation resistance to mechanical damages. In case of longer wire lengths grounding may be needed to minimize the noise in measurement circuit

#### Tolerance for classes of sensors with resistors Pt acc. to PN-EN 60751

Sensor classes	Range of application [°C]	Formula for calculating acceptable deviations [°C]
AA	0÷150	$T = \pm(0,10 + 0,0017  t )$
A	-30÷300	$T = \pm(0,15 + 0,002  t )$
B	-50÷500	$T = \pm(0,3 + 0,005  t )$

|t| - absolute value of temperature

#### Measurement circuit

1 x Pt100			2 x Pt100			1 x TC	2 x TC
2-wire	3-wire	4-wire	2-wire	3-wire	4-wire	2-wire	2-wire
✓	✓	✓	✓	✓	x	✓	x

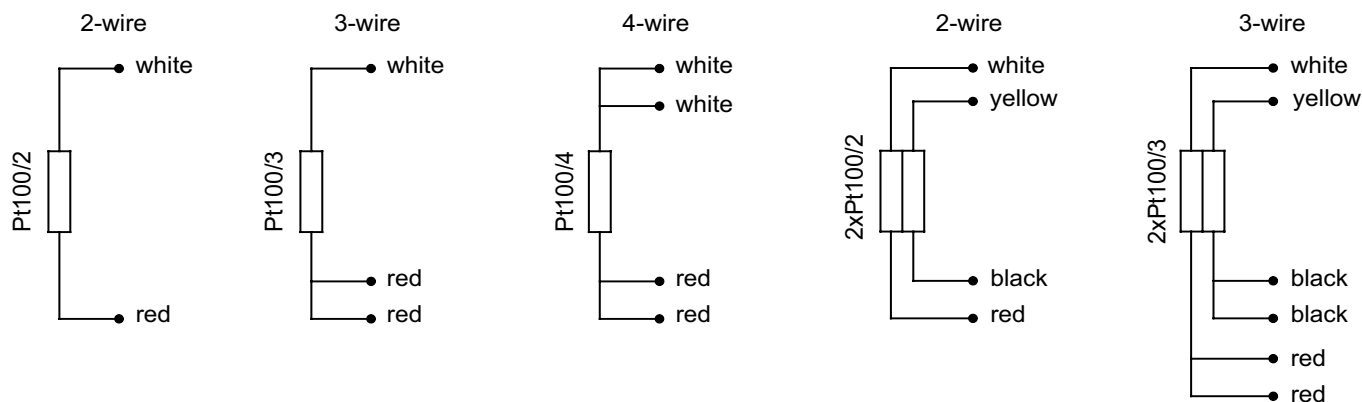
#### Tolerance for thermocouple classes acc. to PN-EN 60584

Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
<b>J</b> <b>Fe-CuNi</b>	from -40 to +375 from +375 to +750	±1,5 ±0,004  t	from -40 to +333 from +333 to +750	±2,5 ±0,0075  t
<b>K</b> <b>NiCr-NiAl</b>	from -40 to +375 from +375 to +1000	±1,5 ±0,004  t	from -40 to +333 from +333 to +1200	±2,5 ±0,0075  t

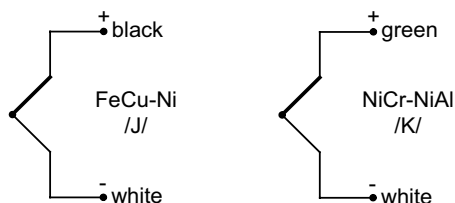
|t| - absolute value of temperature

### Connection schemes

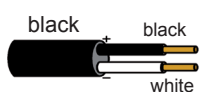
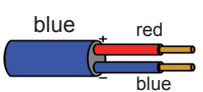
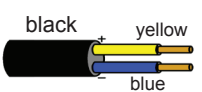
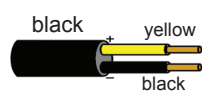
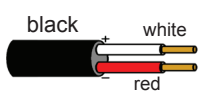
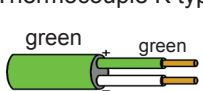
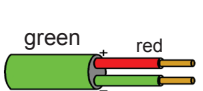
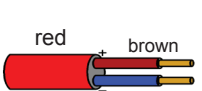
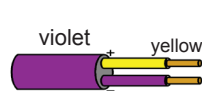
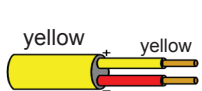
#### Pt100 (thermometric resistor)



#### TC (thermocouple)



### Cable types and colours acc. to the norm

EU	D	GB	F	USA
Thermocouple J type				
				
Thermocouple K type				
				

### Product code

Sensor version	
0	no designation
	single
1	2
	double
Accuracy	
1	A or B
	for measuring resistor
2	1 or 2
	for thermocouple
Measurement circuit (for resistor)	
2	2
	2 - wire
	3
	3 - wire
3	4
	4 - wire
Lead wire insulation type for Pt100	
3	Fek
	teflon with copper shield
3	Ws
	fiberglass with steel overbraid

		Dimension of process connection thread	
		M10x1	M10x1
4	<input type="text"/>		other parameters acc. to requirements
		Lead wire length	
		1,5	1,5m
5	<input type="text"/>		other parameters acc. to requirements

0		1		2		3		4		5	
	TOPE-5	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>

Ordering example:

**TOPE-5-A-3-Ws-M10x1-1,5 m** single sensor with Pt100, class A, 3-wire connection, lead wire with fiberglass insulation 3x0,22 mm<sup>2</sup>, length L<sub>p</sub>=1,5 m, threaded connector M10x1